THE UNIVERSITY OF CHICAGO

Department of Statistics

MASTER'S THESIS PRESENTATION

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Dynamic Factor Model for Multivariate Count Data

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ABSTRACT

In this paper, we adopt a parameter-driven approach and proposed a new flexible and easy-to-interpret dynamic factor model to analyze multivariate count time series. We use Poisson distribution to model count data. However, as contrary to conventional Poisson distribution, the mean parameter in the model is not constant over time. To capture the dynamic feature, we set the Poisson distribution mean parameter as the product of loadings and factors. Both idiosyncratic factors and common serially correlated factors enter in the model, which account for potentially interdependence between series of counts. The evaluation of the likelihood function requires marginalize the joint density of counts and factors with respect to the unobserved factors. Efficient importance sampling together with Monte Carlo integration are used to obtain fast and numerically accurate approximate of the likelihood function. We apply this model to stock trading volume time series. The data is composed of trading counts in 5-min intervals of five stocks from two industry sectors trading in New York Stock Exchange. With the estimated model, we could assess relative impact of the market, the industry and the idiosyncratic shocks to the fluctuation of trading volume of individual stocks.
